

REMARKS

Reconsideration and allowance of this application, as amended, is respectfully requested.

This Amendment is in response to the Office Action dated December 5, 2005. Appreciation is expressed to the Examiner for the allowance of claims 16, 17, 19, 21 and 23.

By the present amendment, independent claims 1 and 18 have been amended to clarify the invention, as will be discussed below. In addition, a minor typographical error has been corrected in each of claims 16, 18 and 19 (specifically, that, in redrafting these claims into independent form, the word "whose" was inadvertently mistyped as "whole").

Reconsideration and removal of the rejection of the independent claims 1 and 18, and their respective dependent claims, over the cited reference to Grigoropoulos et al (USP 6,451,361) is respectfully requested. By the present amendment, each of the independent claims 1 and 18 has been amended to define the feature that:

"melting of the semiconductor film and growth of the semiconductor crystal grains are controlled by the same pulsed laser beam."

This can be seen, for example, from figures such as 1(c) of the drawings. As discussed on page 19, line 10 et seq., in accordance with the present invention, a pulsed laser beam 105 is used to melt the crystal nucleus region 30 and recrystallize this region through crystal growth to form the polycrystalline silicon film 31. More specifically, as discussed on page 19, line 21 et seq.:

"When a laser beam is irradiated under the above conditions, crystallization starts from the crystal nucleus region 30 where the silicon film is thicker than the crystal film therearound. That is, crystal growth begins from a low-temperature region. Crystals grow in a direction shown by arrows in Fig. 1(c)

and a polycrystalline silicon film 31 having a larger grain size around the channel region is formed."

The discussion of Fig. 3 found beginning on page 20, line 3 et seq., provides a further example of this melt recrystallizing operation using a pulsed laser beam. In particular, in each case, the pulsed laser beam is produced in the method described with regard to figures such as 1(a) – (c) and 3(a) – (e) in terms of modulating a continuous wave laser in time into a pulsed laser beam and irradiating it on the semiconductor film.

It is respectfully submitted that the primary reference to Grigoropoulos et al uses a completely different method. In particular, as clearly set forth in column 5, line 60 to column 6, line 5, first and second separate energy beams are required for the process of Grigoropoulos et al. In particular, as discussed in column 5, line 60 et seq., first a melting operation is achieved using an Ar<sup>+</sup> laser beam. Following this, an excimer laser beam is utilized for growth. This is described in particular, for example, in column 5, line 65 et seq., of Grigoropoulos et al as follows:

"This further indicates the application of the Ar<sup>+</sup> laser beam heats up the amorphous silicon sample prior to application of the excimer laser beam. Subsequent to the application of the excimer laser beam, the Ar<sup>+</sup> laser beam sustains molten phase Si."

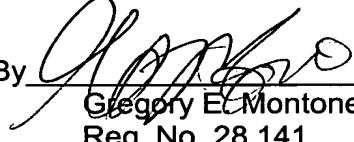
In other words, the process of Grigoropoulos et al specifically requires the interrelated action of a first Ar<sup>+</sup> laser beam and a second excimer laser beam. As such, the operation of Grigoropoulos et al is substantially more complicated, and more expensive than the present claimed arrangement utilizing the same pulsed laser beam both for melting and growth of the semiconductor crystal grains. Accordingly, reconsideration and allowance of the amended independent claims 1 and 18 and their respective dependent claims, is respectfully requested.

If the Examiner believes that there are any other points which may be clarified or otherwise disposed of either by telephone discussion or by personal interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

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Respectfully submitted,  
**ANTONELLI, TERRY, STOUT & KRAUS, LLP**

By

  
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